WHAT IS CLAIMED IS :

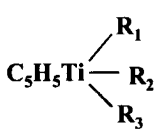
1. A process for hydrogenation of a conjugated diene polymer, the process comprising:

(a) polymerizing or copolymerizing at least one conjugated diene in a hydrocarbon solvent using an organic alkali metal polymerization initiator to prepare a living polymer;

(b) adding a terminating agent selected from amines, esters, ketones or halogen compounds to deactivate an active terminal of the living polymer; and

(c) selectively hydrogenating the conjugated diene polymer using at least one organotitanium compound represented by the formula 1 and a highly active lithium hydride having a precisely controlled particle diameter as prepared from a reactor equipped with a high-speed injection nozzle:

Formula 1



where R_1 is selected from cyclopentadienyl, C_1 to C_8 alkoxy, C_6 to C_{20} aryloxy, or halogen; and R_2 and R_3 are the same or different and selected from halogen, C_1 to C_8 alkyl or alkoxy, C_6 to C_{20} arylalkyl or aryloxy, or C_7 to C_{20} alkoxyaryl or carbonyl.

2. The process as claimed in claim 1, mole ratio of the highly active lithium hydride to organotitanium compound is in the range of 2:1 ~ 30:1

3. The process as claimed in claim 1, wherein the highly active lithium hydride having a precisely controlled particle diameter is prepared by injecting an alkyl lithium solution through the high-speed injection nozzle and reacting the injected alkyl lithium solution with gaseous hydrogen in the reactor equipped with the high-speed injection nozzle, the highly active lithium hydride having a particle diameter within 2,000 nanometers.

4. The process as claimed in claim 2, wherein the highly active lithium hydride having a precisely controlled particle diameter has a particle diameter within 500 nanometers.

5. The process as claimed in claim 1, wherein the organic alkali metal polymerization initiator includes an organolithium compound.

6. The process as claimed in claim 1, wherein the hydrocarbon solvent is selected from aliphatic hydrocarbons such as n-pentane, n-hexane, n-heptane, or n-octane; aliphatic cyclic hydrocarbons such as cyclohexane, or cycloheptane; ethers such as diethylether, or tetrahydrofuran; or aromatic hydrocarbons such as benzene, toluene, xylene, or ethylbenzene.

7. The process as claimed in claim 1, wherein the organotitanium compound represented by the formula 1 includes monocyclopentadienyl(2,6-di-t-butyl-4-methylphenoxy)titanium dichloride, or bis(cyclopentadienyl)titanium dichloride.

8. The process as claimed in claim 1, wherein the conjugated diene includes isoprene, or butadiene.

9. The process as claimed in claim 1, wherein the terminating agent includes at least one selected from the group consisting of benzyl chloride, benzyl bromide, benzyl iodide, methyl chloride, methyl bromide, methyl iodide, ethyl chloride, ethyl bromide, ethyl iodide, butyl chloride, butyl bromide, butyl iodide, acetone, methylisobutylketone, diphenylketone, methanol, ethanol, isopropanol, butanol, phenol, cresol, 2,6-di-t-butyl-4-methyl phenol, ethylacetate, butylacetate, trimethylsilylfluoride, trimethylsilylchloride, , trimethylsilylbromide, trimethylsilyliodide, triethylsilylfluoride, , triethylsilylchloride, , triethylsilylbromide, triethylsilyliodide, tributylsilylfluoride, tributylsilylchloride, , tributylsilylbromide, tributylsilyliodide, triphenylsilylfluoride, , triphenylsilylchloride, , triphenylsilylbromide, and triphenylsilyliodide.